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AUTHOR	Strong, Stanley R.
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SYSTEMS ANALYSIS: A FRAMEWORK FOR DECISIONS AND RESEARCH ON STUDENT SERVICES[1]

Stanley R. Strong
Student Life Studies
University of Minnesota[2]

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Abstract

Systems analysis is a decision framework which integrates research results into decisions and focuses data needs. To illustrate the application of the framework to decisions about student services, this paper analyzes the questions "should we have a counseling service" and "what should the service look like." The analysis yields a counseling service system designed to decrease student "wastage." An operational flow model of the system identifies twelve data points to assess system functioning.

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SYSTEMS ANALYSIS: A FRAMEWORK FOR DECISIONS AND RESEARCH ON STUDENT SERVICES[1]

Stanley R. Strong
Student Life Studies
University of Minnesota [2]

Systems analysis is a decision framework which integrates all relevant information into decision making. Charles Hitch and Robert McNamara in the Defense Department of the United States developed the method about a decade ago and all levels of governmental agencies and services in the United States now use it (Rudwick, 1969). The framework is not new; it is simply an explicit, systematic, and rational approach to decisions. The main five steps of the decision framework are presented in the table below and can be stated as

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Insert Table

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(1) identify the problem, (2) explore its parts, (3) generate possible solutions, (4) evaluate the effectiveness of the possible solutions, and (5) select the best solution. The purpose of this paper is to demonstrate how systems analysis can be applied to decisions about student services, and how it integrates research into decisions. The demonstration keys on the question: should our college or university have a counseling service and, if so, what should the counseling service be like?

We begin with identifying the problem or, in systems language, (1) determine system objectives. Objectives are the conditions we wish to attain with the system in question, in this case a counseling service. To determine system objectives, we need to (1a) identify objectives; (1b) detail the problem; (1c) identify and detail existing systems; and (1d) identify other factors relevant to the problem. To identify the objectives of a counseling service,

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we must first identify the objectives of the institution. This activity is crucial because counseling in the institution can be justified only by counseling's contribution to attainment of the institution's objectives. This is true for all programs in the institution. A list of objectives for the institution would surely include something like supply certain kinds of highly skilled manpower to maintain and develop the broader society, and maximize the return to society from educational resources. Counseling could contribute to these objectives in several ways. The most direct way is to an aspect of the second objective, minimizing student "wastage." Student wastage decreases the effectiveness of an institution in attaining its overall objectives and increases the cost for a given level of effectiveness. Four wastage events which contribute to this loss in effectiveness are the following:

1. Students do not apply their full talents to obtaining benefit from use of the educational resources of the institution, perhaps due to low motivation, poor skills, or distracting problems;
2. Students do not complete their course of study. This event becomes more costly the further the student advances before leaving the institution;
3. Students do not use their skills following completion of their program. The loss is greater the more dissimilar the skills demanded by the student's role in society are from the skills he obtained in the institution;
4. Students do not apply their full talents and skills to their chosen area, perhaps due to a lack of satisfaction or distracting personal problems.

While institutional costs are emphasized here, the other side of wastage events is the cost to the student. To the extent wastage events occur, the individual

loses benefit from his most scarce resources, his time and his talent, and decreases his attainment of his most prized outcome, satisfaction in living.

Decreasing student wastage is an institutional objective to which counseling can contribute (Campbell, 1965; Volsky et al, 1965). More immediate "implementing" objectives for counseling might be increase student motivation and persistence in educational programs and careers through increased clarity of goals, and increase student self-application to education programs and careers through decreased interference from personal problems and inadequate study skills.

The next activity is to (1b) detail the problem to pinpoint the levels and sources of student wastage in the institution. Information about the levels and sources of wastage can be obtained from institutional and departmental records of graduation rates, admissions standards and student program progress, from follow-up studies of graduates and drop-outs, and from surveys of students and staff. The resulting descriptions of the wastage problem experiences by the institution estimate the potential work of a counseling program.

The next activity is to (1c) identify and detail existing systems in order to learn about help-giving programs available to students inside and outside of the institution. Internal help-giving programs may be personal tutor programs, student union programs, chaplain services, health services, and informal staff activities, while external programs may include psychotherapy resources, career guidance and legal aid services. The counseling system should be designed to complement and facilitate these programs, not compete with them.

The final activity is to (1d) identify other factors. We will want to learn about the ability of the institution to accomodate student program changes. Inflexibility diminishes the possibility

of program changes and thus diminishes the value of vocational counseling. Other factors are budgetary and staff limitations, and the political acceptability of counseling.

The next steps are to explore the parts of the problem and to generate possible solutions which, in systems language, is (2) create operational flow model and (3) create possible systems. An operational flow model is a sequence of activities to be performed by a system to attain its objectives. Activities are the functions which must be performed in order to attain the objectives, without regard for the people, things or ideas which perform them. The sequence is a logical ordering of the activities. Creating an operational flow model requires us to (2a) identify necessary activities and (2b) determine the sequence of activities. Once the activities and sequencing have been determined, we are ready to (3) create possible systems. Here we need to identify ways of accomplishing the activities (3a, identify and detail possible components) and to put the "components" together in various combinations to (3b) create alternative possible systems which could attain our objective.

The three major activities of a counseling service system intended to decrease student wastage are (1) assess student educational and career progress, (2) identify and refer for help students with unsatisfactory progress and (3) counsel. The operational flow model in the figure below details these

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Insert Figure

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three major activities. The processes numbered 1.1, 1.2, and 1.3 identify the major steps in student program and career progress. The processes numbered 2.1, 2.2, 2.3 identify the activities of identifying students with unsatisfactory progress and referring them for help. The processes numbered 3.1, 3.2, 3.3, and 3.4 identify counseling and non-counseling programs. The key problem

the activities are intended to impact, student wastage, is in the center of the diagram and is numbered 4.0.

In the operational flow model, students move in time from (1.1) progress in educational programs, to (1.2) termination of educational programs, and (1.3) career progress. We can see the points of contribution to student wastage in terms of unsatisfactory and unsuccessful progress. Wastage results from (1) students who are experiencing unsatisfactory progress in their programs but are not identified and not referred to counseling, (2) students who do not complete their educational programs successfully, and (3) students who do not experience satisfactory career progress. Student program progress could be assessed through continuous program progress assessment, tutor and lecturer contact, or by the student. Unsuccessful program termination can often be identified from institutional records of student failure to complete programs. Few institutions attempt to assess the career progress of their graduates. Yet this is the most important means of assessing the institution's contribution to society. Periodic follow-ups are difficult, but such information can be obtained by questionnaires or interviews, using sampling techniques, without great expense. The importance of the information justifies the costs.

The next major activity, identify and refer students with unsatisfactory progress, begins with the crucial activity (2.1) identify students with unsatisfactory progress. Those who are identified may be helped by counseling. Those who are not identified cannot be helped, and contribute to student wastage. The second related activity is (2.2) diagnose problems. Given that a student is experiencing unsatisfactory progress, we need to determine why. We must define which causes of unsatisfactory progress are to be considered counseling problems, and which causes are to be considered non-counseling problems. Incorrect diagnosis at this point will entail the use of resources

later in the system to correct the diagnosis, and a loss of students' time. The final process is (2.3) refer to appropriate helping program, either counseling or non-counseling. Students identified as having unsatisfactory progress but not referred to a helping program contribute to wastage.

Three possible methods of carrying out these activities are (a) search institutional records, identify students whose performance is unsatisfactory, and contact these students and offer help; (b) solicit help from other members of the institution who work closely with students such as personal tutors and student union officers, and ask them to identify and refer students who need help; (c) inform students of the problems appropriate for helping services, and rely on them to identify and refer themselves. In all cases, we need to consider not only the methods of identification and referral but also the level or vigor with which the method is to be pursued. Obviously, research on the effectiveness and impact of these three possibilities would be useful. Asking students or others to refer students requires that they know what services are available and what problems are appropriate. Some means of informing them is essential. Self-referral by students has a great advantage in that students are the most aware of the state of their own progress. Probably a system which relies on all three methods in some balance would be most effective. In deciding, we must evaluate the lossage rates (wastage) to non-identification, mis-diagnosis and non-referral.

The first process in the activity of counseling and non-counseling programs is (2.3) refer to appropriate helping program. We have already discussed this activity, but we now see that the point of referral is the point of exchange between counseling and non-counseling programs. Students inappropriately referred must be re-referred, entailing more expense for the institution and the student. Confusion in the referral process will

increase loss due to non-referral. Counseling activities are presented as (3.1) select treatment method, (3.2) counsel, and (3.3) terminate counseling. Non-counseling activities (3.4) are not further detailed.

A considerable body of counseling research seeks to evaluate different methods of treatment for different problems. Particularly noteworthy is the excellent work of Truax and Carkhoff (1967) and Gordon Paul (1966). This information can help us to decide upon the problems we shall identify as appropriate for counseling, the treatments we wish to make available, the skills persons in the counseling program should have, and the alternative sources of helping that should be developed. In making these decisions we can be guided by the student problems and the alternative sources of help we identified. We will need to work out relationships among these various sources of help as to what problems are appropriate for each and how the helping programs work together. In this connection note that referral could be done by one office as an exchange service, be left to be sorted out by students, or could be a part of all helping programs. We will have to consider trade-offs between the resources needed to resolve problems, the resources available, and the maximum attainment of our objective, decreased student wastage. For example, should we concentrate on a few students with very difficult problems, or should we refer (or ignore) such students and concentrate on students with problems which do not require as much time to resolve? Depth psychotherapy might not be the best use of our resources. This can only be determined by creating alternative systems and estimating their relative effectiveness and costs in attaining our objective. We will need to develop ways of evaluating the effectiveness of the counseling service in terms of the expected immediate outcomes of counseling such as increased motivation, clearer self-understanding, and decreased emotional conflict.

Counseling may lead the student to seek another institution or a change in program. Methods should be created to help these students, and will usually entail interacting with non-counseling helping programs. Students who leave the institution contribute to wastage. However, the meaning of wastage as a result of counseling should be evaluated in terms of the probable longer term wastage which would have resulted from persistence in unsatisfactory programs and careers. Finally, students who remain in the institution remain in the status of "student program progress."

We have discussed the need for research to make decisions about the ways the activities and processes in the counseling system can be carried out. Putting the possible ways or components together forms the possible alternative systems, one of which will be selected to be implemented. One viable alternative is always "do nothing," which is a possible answer to the question "should the institution have a counseling program?"

The next step in the decision process is to evaluate the effectiveness of the possible solutions or, in systems language, (4) evaluate alternative systems. Various models and techniques are available to evaluate the effectiveness and costs of alternative systems (Goldman, 1967; Rudwick, 1969). Briefly, these involve the following activities:

(4a) Create and evaluation model. In our case, quantifying the operational flow model will serve this function.

(4b) Determine measures of effectiveness and system characteristics. Working from the operational flow model in the figure, 12 aspects of the systems functioning will need to be estimated in order to evaluate the alternative systems. Estimates of these aspects of the functioning of the alternative systems can be obtained from the research carried out in the first steps of the decision model and

from research results reported in the literature. The following aspects of system functioning need estimates:

1. Frequency of satisfactory and unsatisfactory program progress;
2. Percentage of students with unsatisfactory progress who are not identified;
3. Accuracy of diagnosing student problems;
4. Volume of counseling and non-counseling problems;
5. Students with problems identified but not referred;
6. Accuracy of referral according to problem-service concordance;
7. Kinds of counseling treatment methods selected;
8. Level of immediate success of counseling treatment;
9. Number of students changing programs or leaving the institution;
10. Experience of non-counseling programs such as frequency of use, kind of problems and success;
11. Number of students not satisfactorily completing their program;
12. Career progress of graduates.

(4c) Estimate effectiveness of alternative systems. The data are combined to yield total estimates of the impact of each alternative system on student wastage.

(4d) Estimate costs of alternative systems. We will need to estimate the cost of components such as personnel, materials and facilities in the implementation stage and in the longer term for each alternative system.

The final step is (5) select best alternative. Selecting the best alternative requires setting either effectiveness or costs at a standard level and determining the relative costs or effectiveness for each alternative. Other factors, such as political climate, existing staff skills, and institutional flexibility must be considered. The task of analysis can be very complex or quite simple. The more accurate estimates we can make, the more sensible it is to use complex analyses. The less data we have, the simpler our analysis must be, and the less sure we can be of the conclusions.

This brief examination of the systems analysis approach to decisions illustrates that the framework makes heavy use of research results. Research which describes or evaluates ways of accomplishing any of the activities necessary to accomplish identified objectives has a direct impact on what we choose to do. To do our best with institutional resources, we must use some framework which integrates the information we have in our decisions about student services. Systems analysis is such a framework.

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Footnotes:

[1]An earlier draft of this paper was presented at the University of London Conference on Student Counseling, London, England, February 15, 1974.

[2]On Sabbatical leave from the University of Minnesota and Fulbright Fellow, University of Aston in Birmingham, England, 1973-74.

Table

FIVE-STEP DECISION MODEL

1. Determine System Objectives

   1a Identify objectives
   1b Detail problem
   1c Identify and detail existing systems
   1d Identify other factors

2. Create Operational Flow Model

   2a Identify necessary activities
   2b Determine sequence of acitivites

3. Create Possible Alternative Systems

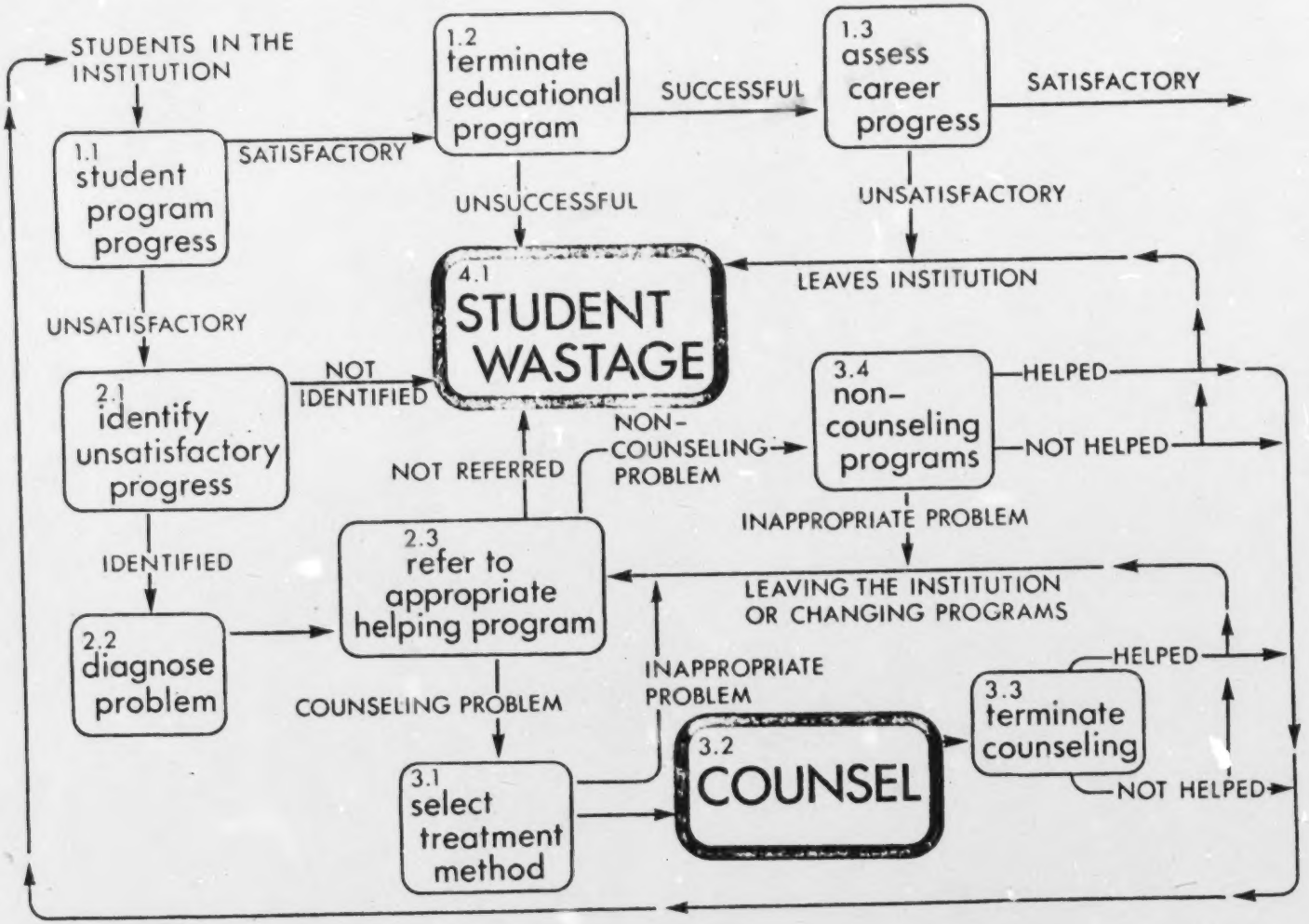
   3a Identify and detail possible components
   3b Create alternative systems

4. Evaluate Alternative Systems

   4a Create evaluation model
   4b Determine measures of effectiveness & system characteristics
   4c Estimate effectiveness of alternative systems
   4d Estimate costs of alternative systems

5. Select Best Alternative

OPERATIONAL FLOW MODEL OF COUNSELING INTENDED TO DECREASE STUDENT WASTAGE



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